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Designed by the Pupils for the Pupils: an Autism-Friendly School

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Designed By the Pupils, for the Pupils: an Autism-Friendly School

Abstract

As a society we have a responsibility to provide a truly inclusive Built Environment. For those with Autistic Spectrum Condition (ASC) however, the world can be a frightening, difficult and confusing place. The challenge of integrating more fully into society can be compounded by an alienating Built Environment. This is particularly damaging if the pupil with ASC cannot feel at ease in their school surroundings, both for academic and social purposes.

Consequently there has been a growing interest in promoting autism-friendly environments, especially in a school setting. Findings to date have generally advocated an accepted reductionist or generalist approach when providing an autism-friendly Built Environment. However these studies, whilst very well intentioned, have rarely involved those with ASC to comment on and then instruct designers on what, for them, constitutes an autism-friendly learning environment. If going to be truly inclusive, the authors contend that those who are most knowledgeable about ASC, those with ASC, whenever possible, should be given the opportunity to comment on the design of our shared Built Environment.

Hence this paper first introduces some of the challenges faced by those with ASC in trying to cope with their surroundings before proceeding to outline the development of a simple school design 'jigsaw' kit that helped pupils with ASC to communicate ideas for their perfect school. Used in four design workshops, secondary school aged pupils (aged 13-18) with ASC imparted their likes, dislikes and what was most important to them within the school environment. This facilitated comparison with current autism-friendly guidelines and provides a valuable insight into the mind of the secondary pupil with ASC.

It is hoped that by increasing awareness and then including those with ASC in describing what might constitute an autism-friendly learning environment, it will help facilitate greater inclusion of the ASC child into mainstream education and society at large.

Keywords

Architecture; Autism Spectrum Condition; Children; Inclusion; Participatory Design

Introduction

The inherent relationship between people and place means that the physical and Built Environment plays an important role in our lives. However this is not always an enjoyable relationship. When Pallasmaa writes, 'I confront the city with my body,' (2005, p.40) he is not only identifying the interaction between a person and their surroundings but also the challenge, physically and mentally, that can exist for many individuals when inhabiting our Built Environment.

Arguably this challenge is intensified for those with processing difficulties or sensory sensitivity such as those with Autism Spectrum Condition. Autism Spectrum Condition (ASC) is a term that covers the many sub groups within the spectrum of autism. Autism can be termed as a lifelong complex developmental condition, characterised by a triad of qualitative impairments in social communication, social interaction and social imagination, (Wing & Gould, 1979), the range of which is such, that while some with ASC may be able to live relatively independently, others will require lifelong continuous support. Additionally, those with ASC often struggle with sensory sensitivity to visual, auditory, tactile, proprioceptive, gustatory and olfactory stimuli. (Hinder, 2004; Bogdashina, 2010). Hence the Built Environment can have a major impact upon those with ASC, many of whom can find their environment confusing, disorientating and even frightening. (Grandin, 1995; Harker & King, 2002; Grandin & Panek, 2014)

Moreover, not only may those with ASC exhibit different sensitivities and personal difficulties, the severity of these too can vary. Therefore when considering what might constitute a supportive Built Environment for those with ASC, the design parameters are 'fluid and variable'. There is of course the danger when dealing with autism, as with any condition or disability, that overly prescriptive design guidelines for the Built Environment may not take into account variations between individuals and their different levels of ability. This can mean that design guidelines can become overly generalist in content and not best suited to a particular user's needs. Also, because individuals may present with more than one condition, further adding to design complexity, the challenge is both complicated and difficult. However that challenge is one that we cannot avoid or ignore. Collectively we all have a societal duty and responsibility to both provide and ensure an inclusive society that shares and embraces difference.

The Inclusive School Environment

Currently in the United Kingdom, the government, wherever possible, is supporting integrating those with special individual needs into mainstream schools. Whilst not always

without disagreement, the government's preference is to support inclusion and shared learning from one another. (Humphrey 2008; Frederickson et al, 2010; Dillon et al, 2014; Lauchlan & Greg, 2015.) Specialist schools are now therefore being considered primarily as places for pupils with more profound learning or behavioural difficulties. Alternatively, pupils with milder learning difficulties, often with the benefit and aid of additional classroom support, are being encouraged to attend mainstream schools. The dual hope is that this strategy will, in time, help these pupils better integrate into mainstream society and also increase tolerance and understanding of disability in the general population. (Jones, 2013)

To aid in that aspiration, there are a number of guidelines when designing for those with ASC in a school environment. These give helpful directions on what type of environment to provide for pupils with ASC. However, despite being extremely well-intentioned, the recommendations do tend to be generalist in nature. (DfEE, 2001; DoENI, 2005; DfEE, 2009) The questions that therefore need to be asked, as with all design guidelines, are; 'how accurate are they; can they be improved upon and do they aid in supporting an inclusive school environment?'

Crucially however, if being **truly inclusive**, all those with special educational needs, including those with ASC, need to be given an opportunity to impact into the design of our shared Built Environment. Importantly and tantalisingly, this might not be of benefit just to those with ASC, but to the wider society as a whole. Those who have sensory difficulties, in effect by default, have a 'critical eye', and may be well placed to speak for many others who have not been diagnosed with similar sensitivities or others who can still find the Built Environment difficult to tolerate and navigate. A very basic but profound premise is that those who can best understand a disability or condition are those with the disability or condition themselves, or in some instances, those who care for them. Conversely, those who currently have the biggest say in our Built Environment, the design profession and policy makers, are not experts in those areas. Thus, there is a necessity for the design profession and society at large to better understand the needs, likes, dislikes and preferences of those with special needs, if wanting to provide a genuinely inclusive Built Environment.

Unfortunately, with regard to ASC, the desire for better understanding is compounded by those with ASC often having difficulty in verbal communication. Whilst those with ASC can often communicate their likes and dislikes through their actions, it is still reliant upon designers and other professionals having the skills and desire to accurately read and interpret that behaviour. (Gaudion et al, 2015) This is a difficult challenge and one that the design profession is not expert at. It could therefore be argued that an immediate and necessary challenge for designers would be to investigate ways and methods of facilitating

an informative dialogue between those with ASC, despite their communication difficulties, and those who are responsible for our Built Environment.

To date, much of the focus on ASC and the Built Environment has been on the school environment. (Khare, 2010; McNally et al, 2013; Martin, 2014) That is not surprising. The school environment itself can be considered as 'a silent curriculum' (Taylor, 2009) or a third teacher (Nair & Fielding, 2005; Cannon Design et al, 2010) and the setting to learn important social skills from trained and supportive staff. It is one that can have a direct and profound impact on any pupil. It is their world, a 'micro-city' (Hertzberger, 2008) within the greater Built Environment and the core location for many of their informative social interactions and learning experiences. The importance of the school environment-pupil relationship is substantiated when considering the fact that 'ninety-six per cent of school teachers agree that the school environment has an influence on pupil behaviour.' (Reed, 2011) Yet it is one that children rarely get the opportunity to have a say into. This is problematic. Article 12 of The United Nations *Convention on the Rights of The Child* stipulates that when adults are making decisions that affect children, those children should, 'have the right to say what they think should happen and have their opinions taken into account.' (United Nations, 1989) Simply put, that would mean that pupils, irrespective of their background, should have a say **and be listened to** with regard to what they (*the pupils*) want from their school environment. Thus, pupils with ASC, like others with special needs, should be participants and have a meaningful say into school design. A challenge though is how to best facilitate this dialogue and support that participation. If successful, there are many benefits. Increasing participation into the design of the Built Environment for pupils can increase an understanding of their physical environment. Moreover, including others in the design process ensures that designers have access to valuable user knowledge and experience. (Woolner, 2012) The advantages therefore in a school setting would include the probability that designers would be better informed as to what type of learning environment is needed by the pupils, while the pupils themselves would benefit by being involved and better prepared to take ownership of their own learning environment.

Recognising that a problem exists in communication between pupils with ASC and the design profession with regards school design, the authors sought to find a way to facilitate this dialogue between both parties. The challenge was therefore to develop a suitable tool that would enable the pupils with ASC to communicate their ideas freely to architects. If wanting to promote participation, it is a simple but profound notion that appropriate tools are required to facilitate a meaningful conversation (Clark, 2010, p.41) In the case of pupils with ASC, any successful tool would need to be accessible and easy for the pupil to use, not only to bridge the gap between non-designer and designer but also crucially, between adult and

child. Believing that physical models are a more common ground and 'shared tongue' between the language of drawing, (favoured by the designer), and the spoken word, (preferred by the non-designer), (McAllister & Maguire, 2012) a simple 'jigsaw' kit-of-parts was developed by the authors to be used by the pupil with ASC in order to (*hopefully*) communicate their ideas and feelings for what would constitute to them, an autism-friendly secondary school learning environment.

Methodology

In Northern Ireland, the Department of Education (DoENI, 2003) published *The School Building Handbooks (Nursery, Primary and Secondary)* provide advice and guidance on the planning and design of new school buildings and the standards to which they should conform. They deal with the site, the building, circulation space and playing facilities – all matters which influence the learning environment within which the curriculum is delivered. *The School Building Handbooks* therefore provide guidelines for designers to work towards an approved schedule of accommodation, both in terms of space standards and the number and types of different room within any new school. If required, alterations from the approved accommodation can be negotiated between the school and the Department of Education dependent upon particular need and individual circumstances.

Essentially the *School Building Handbooks* therefore act as a template to what will be included in any secondary school design in Northern Ireland. Taking the accommodation standards as outlined in the *School Building Handbooks* as a starting point, the authors were able to list and get sizes for the different types of classrooms and accommodation that would comprise a hypothetical, new small secondary school that included provision of an ASC Resource Base. The ASC Resource Base is a classroom specifically for pupils with ASC within the mainstream school and is a growing in popularity as a means of promoting integration of the child with ASC with their peers. (Freidrickson et al, 2010) Drawing the selected rooms to scale and then colour coding them to help signify their differences, provided a simple but legible 'jigsaw kit' for such a small hypothetical secondary school, including an ASC Resource Base, the parts of which could be arranged in separate ways to represent different school layouts. (Figs.01&02)

Jigsaw Component Parts	Accommodation
ASC Resource Base	
Quiet Room	Including provision of both quiet room and sensory room
Drama Suite	Drama Classroom and accompanying Green Room
Home Economics Suite	Home Economics Classroom and Preparation Room.
Science Suite	Science Laboratory and Preparation Room.
Technology Suite	Technology Studio, Materials Store, Planning Suite, Systems & Projects Stores
Music Suite	Music Classroom, Group Practice Room, Teaching Room, Keyboards Room & Instrument Store.
Art Suite	Art & Ceramics Classroom, Kiln, ICT Room and Stores.
4 No. General Classrooms	Including shared stores and break-out spaces for each pair of classrooms
2 No. Junior Classrooms	Including WC's and shared stores between each classroom.
Library	Including a store and also the adjoining principal and vice principal offices.
Staff Room	
Sixth Form Base	
Medical Suite	Including occupational therapist, speech therapist and first aid rooms
Dining Hall / Social Concourse	Including adjoining kitchen.
Multi-Purpose Hall	Including adjoining PE Store.
Sports Pitches	
Playgrounds	
Green House	
Toilets	

Fig 01. The jigsaw kit of parts.

The 'jigsaw kit' was developed in the hope and intention that pupils with ASC currently attending secondary schools with an ASC Resource Base could be given the components and be invited to compose what they would consider, the layout for an ideal small secondary school. The aim was to facilitate dialogue between designer and pupil and try and get a better understanding of what the pupils themselves considered important in the school environment. If the pupils thought that a piece was missing from the provided 'jigsaw kit', additional blank parts were provided that could be named and added to their design. It was also hoped that not only would the finished jigsaw school design give an insight into the

pupils' preferences but also that the process of doing the jigsaw might give an opportunity to chat to the pupils and let them describe and explain the rationale for their choices.

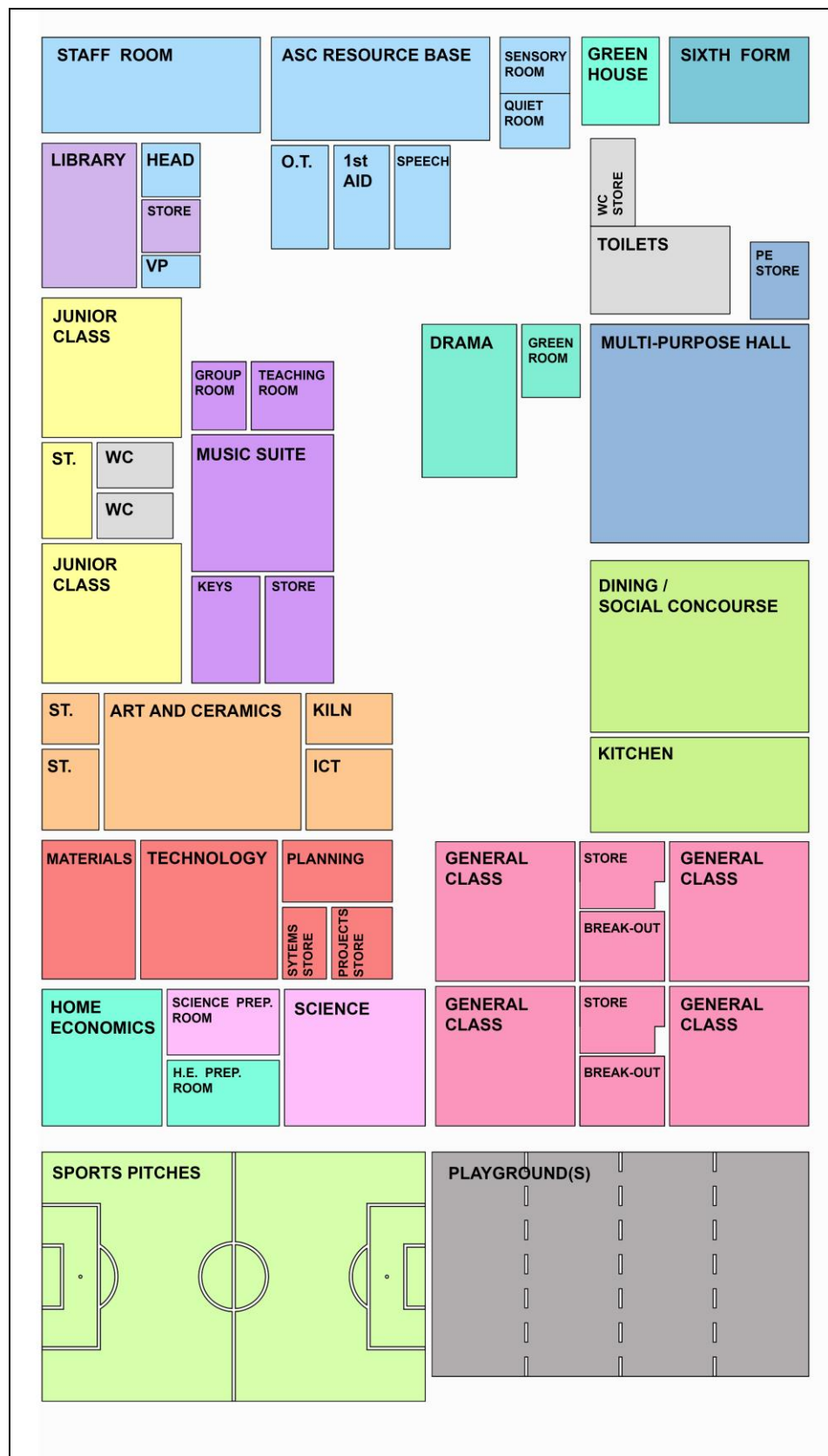


Fig 02. The jigsaw kit of parts.

Workshop Methodology

After discussion with the relevant administrative Education Authorities and South Eastern Education Autism Intervention Service, two schools were approached and asked if they would consider helping with the study. The schools are both mainstream secondary level schools for pupils (male and female) aged between 11 and 18. Both operate ASC Resource Base classrooms specifically for pupils with autism. In each school, the ASC Resource Base is used for teaching purposes and as a base to return to, if the pupils can manage to join their peers intermittently in mainstream or shared subjects. The hope in both schools is that with additional help, support and the security of having their own base with specialist staff, the pupils with ASC will be able to better integrate into the wider school and reach their full academic potential.

After proposing the study; the principals, teachers and then both parents and pupils of the two schools very kindly agreed to help with the project. When ethical approval had been obtained from University Authorities and permission granted from all parties to proceed with the study, the workshop sessions were scheduled by the teachers of both schools into the pupils' timetables.

Four workshop sessions were carried out, two in each school. Each workshop session followed the same pattern, so that they would be as similar to one other as possible. Each started off with a short visual presentation introducing the subject of architecture to the pupils. This included some light hearted quiz elements, such as guessing what country a selected vernacular house originated from, or trying to identify from what movie, a cinematic still including a famous landmark building was from. This was so that everybody in the class could feel part of the workshop, even if the pupil then decided against taking part in the workshop design phase. The presentation then finished with a brief explanation of the 'jigsaw kit' and what the workshop hoped to achieve.

The pupils were invited to work together in groups or to work alone when working with the 'jigsaw kit', whichever they felt more comfortable with. (Fig. 03) The workshops were carried out in the pupils' own ASC Resource Base classroom so again they would feel as comfortable as possible. Any pupils who decided against taking part were accompanied by school staff to do another activity in the classroom. A reference sheet detailing what all of the parts of the 'jigsaw kit' represented was displayed on the classroom interactive whiteboard screen for the pupils to reference if needed, in addition to a member of staff and a researcher being on hand to answer questions or queries that the pupils might have during the design phase. To try and make the workshop more manageable, but also to try and help the pupils focus primarily on the school layout, it was decided that for all the workshops, the

pupils would be asked to design a single-storey school and ignore both the building's orientation and its surrounding context.

When the pupils were happy that they had completed their designs, the finished layouts were photographed and the pupils invited to explain why they had made their design choices. Questions were kept simple with an emphasis on what the pupils liked and disliked about their school environments, why they had organised their designs in the way that they had and what they felt was important for others to consider if designing a new school. With the visual interest generated by the 'jigsaw kit', a number of the pupils were able to verbally express their preferences, many of whom took pride in explaining their thinking and rationale to the staff who were present. Over the four workshop sessions, seven completed designs were recorded and coded anonymously as below.

Schools		Participants	
'Town High'	H1	Adam, Ben & Cate	
	H2	Dan	
	H3	Eddie, Fred, Gary & Helen	
	H4	Ida	
'Town College'	C1	Karen & Lewis	
	C2	Mark, Nigel & Oscar	
	C3	Paul, Quinn & Ray	

Fig 03. Participating pupils

Results

After the pupils' designs were photographed and their comments recorded, the designs were drawn up and then compared with one another. Each is illustrated on its own fact sheet accompanying this paper after the '*References*' section. Seven considerations were then identified as being important to the pupils, these being; playground provision, a sense of security, noise and comfort, internal circulation spaces, legibility, their own ASC Resource Base and the wider school environment.

Each will now be discussed in turn.

i. Playground(s):

All of the pupils' designs included direct access from their ASC Classroom Resource Base onto their own individual external play area. This was in addition to providing additional playground areas to be accessed from other areas of the school. Being able to play safely outside was a recurring theme in the pupils' design proposals, with pupils frequently stating

that they enjoyed the freedom to be outside, as long as they felt that it was safe. An ability to go somewhere to 'let off steam' and work off any frustrations is important for pupils with ASC as signified by Helen (H3) when stating 'I feel good when I run around in the PE Hall,' before going on to state that '...having a playground outside is important butit is good to have choice where to go.'

Being able to choose between alternative playgrounds was voiced as important by a number of pupils. Jack, one of the pupils with ASC from the 'Town High' School, when chatting about school as an onlooker whilst others undertook the design workshop, stated that 'playgrounds can be territorial... so you need lots. It is good to have alternative places to go.' Dan (H2) echoed this stating 'having a number of different playgrounds gives more choice for places to go.' That need for choice and variety was further exemplified by Mark (C2) who recommended that 'Playgrounds need to be divided into different areas for different play.' Being able to avoid potential conflict or large numbers of pupils was also noted by Eddie (H3) as important, as evidenced when he stated that he wanted his 'own playgroundwith not too much people to walk into.'

ii. Security:

Often the pupils would talk about or illustrate the need for a feeling of safety and security in their school designs. Noticeably this was not just for themselves in their siting of their ASC Resource Base, but also often in relation to their consideration of the junior classrooms. The pupils with ASC frequently expressed an empathy for the potential difficulties and concerns of the younger pupils in the school. Paul, Quinn & Ray (C3) stated that it is good both to 'separate the younger and older pupils at play' and also 'to have teachers watching the playgrounds.' Knowing where the staffrooms were and where staff could be contacted was often emphasised as important. In the pupils' school designs it was also noticeable that on occasion it was not just the staff room that was given a prominent position in the school or a position adjacent to the ASC Resource Base, but that importance was sometimes extended to the siting of the Sixth Form Centre where the oldest pupils in the school would be based. That extra responsibility and respect for the older pupils was voiced by Mark, Nigel, & Oscar (C2) when they went further by providing an extra room for the sixth formers stating, 'Give the 6th Year (*pupils*) a gaming room because they are more responsible'.

Engendering a sense of safety and security, not just for those with ASC, is vitally important in a school setting. This concern is recognised as by Cannon Design when stating 'Children are only ready to learn only when they're safe and secure, so address those needs before considering any other aspect of a child's environment.' (2010, p. 36)

However, it was striking that the pupils with ASC were so aware of this, especially in relation to others in the school.

iii. Noise & Comfort:

Noise was always quoted as being important by the pupils. Hence a number of the designs grouped together the elements of the school that the pupils categorised as being noisy and then purposely distanced them away from the position of their own ASC Resource Base. Eddie (H3) was succinct but direct in his judgement simply stating, 'Noise is hard.'

Accommodation that was classified as noisy included the dining hall, drama and music classrooms. Mark, Nigel, & Oscar (C2) went further by stipulating that all music rooms must be 'soundproofed' and that all of the general classrooms should have quiet rooms, where pupils could withdraw to if they needed to, provided within them. Generally, as a place of calm and respite, pupils wanted a quiet room in close proximity to their ASC Resource Base or alternatively, positioned centrally in the school so that it could be easily accessed from all areas. Paul, Quinn & Ray (C3) even went as far as suggesting that there should be no school bells in the school but instead a sound-system speaker in classrooms that could announce the end of a timetabled period in each school room at a reduced volume to that of the school bell.

The recurrence of noise as a major concern for the pupils is significant. An inability to filter out or being highly sensitive to unwanted noise is a challenge faced by many people with ASC. (Stiegler & Davis, 2010; Bogdashina, 2016) Therefore unwanted external stimuli can always mal-affect pupils with ASC. That can be the difference in the pupil feeling at ease and able to engage fully in all aspects of school life, remembering E. T. Hall's assertion that 'Space perception is not only a matter of what can be perceived but what can be screened out' (1988, p.44). Hence the prevalence of pupils' concern for trying to cope with unwanted noise in the design workshops is very evident. This is across all scales: from being a major design generator for the pupils in their overall school design at a macro-level to the care in placing quiet rooms in the school at a class level.

The message from the workshops is very clear. Noise is a very major concern for pupils with ASC.

iv. Circulation

Those with ASC often find the incidental and unplanned difficult to deal with. (Williams, 1996; Grandin & Scariano, 2005) The realm where this tends to occur in schools, in addition to the playgrounds, are the school corridors and stairwells, especially between timetabled classes. Hence it is unsurprising to see an emphasis on trying to deal with circulation spaces by the

pupils in their designs. That might be another reason why all of the designs included direct access from the ASC Resource Base to an external play area therefore making the need to negotiate shared corridors redundant by the pupils with ASC when wanting to go outside.

The most dramatic interpretation of an alternative to the school corridor was the design offered by Dan (H2) who after starting with a carefully composed linear jigsaw plan, stopped and enquired if the design 'should be his *perfect* school design and if so, could he do somethingdifferent?' When informed that he could of course change his design to what he wanted, Dan proceeded to separate all of the rooms in the school making them all separate detached elements. His reason for doing so was simple. When asked why he had changed his design and presented a second design comprised of completely unconnected elements he stated, 'Schools are too squashed. I get squashed in the corridors, in the hallways and the canteen. It's ... like.... claustrophobia,' before adding that, '...you should bevel corners so that would give more room to walk and not get squashed and pushed and shoved.' Clearly Dan wanted more space throughout all of the school circulation areas.

Other pupils also wanted more space in their circulation areas. In particular space (and time) to prepare for entering the Dining and Physical Education (PE) Halls was requested. This was done by purposely distancing the ASC Resource Base away from both Halls in the design by Adam, Ben & Cate (A1) because 'that gives you time to prepare for the different activities that happen there', or as seen by providing extra circulation space alongside the Dining Hall to give pupils time to 'line up' and ready themselves mentally before entering 'the noisy Dining Hall'. (C2)

v. Legibility

Commonly those with ASC like structure and order in their lives. (Williams 1996; Whitehurst, 2006; Lawson 2011) This need for legibility, structure and rationale was evident in a number of the pupils' designs. Unsurprisingly then, the PE Hall was always positioned alongside the sports pitches. Alongside these, the medical and first aid accommodation was commonly added because the pupils reasoned that it would be those with sports injuries who would most likely need to any first aid facilities. Along with sometimes ordering and organising the school accommodation together in their designs by what the students perceived as noisy, two school designs specifically grouped what the pupils termed as 'creative' accommodation together: art, drama, music, technology. (H3 & C3) This was taken to a further level of interpretation by Ida (H4) who expressed each creative class element in a fan arrangement on the grounds that, within the design of her school, 'The creative classes should look artistic.' Hence the choice of a radial fan arrangement by Ida – by differentiating the art, drama, music, technology suites from the rectilinear and perpendicular school

accommodation elsewhere, she was expressing their purpose and therefore aiding in wayfinding and spatial orientation for pupils in the school.

That need to have legibility within the school was also evidenced by Mark, Nigel and Oscar (C2) who, having arranged their jigsaw accommodation around a central organising interior court explained that this was because the school should not only, 'look good on the inside...it should make sense on the inside.'

A different expression for the need for legibility and order was provided by Karen, working alongside Lewis (C1). Her position of the ASC Resource Base was purposely placed extremely close to the main school entrance so that, as she explained, 'The first classroom you come to should be the ASC Resource Base. Then you can check your timetables, get told about changes and prepare for the rest of the day.' This illustrated Karen's preference for wanting to know what was happening beforehand in order to avoid the unexpected and surprising during the school day. Knowing what to expect, whether temporally or spatially, can help all pupils navigate their way through the school day. Without that reassurance, it would be unreasonable to expect any child to commit to and feel confident enough to take ownership of their own school environment. Not being able to commit to or trust in any place is potentially frightening for everybody, a concept summarised succinctly by the Norwegian architects Snøhetta as a 'type of tyranny' that will lead to dislocation and disjuncture. (2007, p30.)

vi. ASC Resource Base.

First and foremost, all pupils included their resource base within the school. Even Dan (H2) with his disparate fragmented arrangement did not want his base on the edge of the school by itself. The desire and appreciation of an ASC Resource Base as a place to go at break times was evidenced by Cate (H1) when she stated very simply that she did not like free time, instead, 'wanting somewhere to go to watch DVD's in quiet.' Helen (H3) reiterated the need for an ASC Resource Base but went further in her specification by not wanting the classroom to stand out, stating, 'You need a room at break time and lunchtime with fun stuff. But it should look like a mainstream classroom.' This would imply that for Helen, being integrated within the school is more than just being geographically positioned with the body of the school; it is also important for the design and expression of the ASC Resource Base to be at one with the rest of the school. Eddie (H3) agreed with Helen but elaborated, stating that the ASC Resource Base 'needs to be quiet to focus on work.'

Occasionally (unsurprisingly) the pupils positioned their ASC Resource Base adjacent to what is their favourite subject classroom (sometimes the Technology Suite which commonly includes the school's computer suite). Alternatively, one group specifically sited their base

alongside the Dining Hall because according to Quinn (C3), 'The ASC Resource Base needs to be close to the canteen so you can get in first,' once again illustrating the preference of avoiding noise and crush in the communal areas of the school.

It was clear from the school designs and speaking to the pupils that they enjoyed and wanted to be integrated and part of the wider school environment. Having a well-considered ASC Resource Base is vital in that regard. In the micro-city that is school for the pupil with autism, their classroom base is the place of familiarity and comfort, a constant in a potentially changing wider school environment. In having a place to go to that is personal and familiar to a child with ASC, as with all of us, is important.

vii. The Wider School

It was also noted that a number of the pupils, when considering their own individual school designs had individual requirements that were important to them. Adam, Ben and Cate (H1) said that as sustainability today is important, any 'perfect school' would therefore need to be sustainable. Similarly Mark, Nigel, & Oscar (C2) stated that, because 'fresh air is good', all classrooms throughout the school should have direct-door access to the exterior. Perhaps the most descriptive request came from Adam (H1) who stated 'It is important how it (*the school*) looks. Gates and small windows are scary,' before requesting that the school instead 'should be colourful'.

Discussion

Of course the use of the 'jigsaw kit' represents a huge simplification of what constitutes the overall school environment. A further limitation would be the small sample size of the participants in the four workshop sessions. However despite these limitations, the pupils were still able to convey a range of thoughts and concerns as to what they felt was important to them in the school environment. Noise was the primary design factor in the workshops. This was both inside the classrooms, where quiet rooms were sometimes included, provision of a quiet room close to the ASC Resource Room or in the overall organisation of the school layout. Often the ASC Resource Base, viewed by the pupils as their 'home within the school', would be sited away from what the individual students termed as the noisy parts of the school. The marked dislike of noise supports observations made by other authors when stating that acoustic considerations are extremely important for pupils with autism in a school setting (Humphreys 2005; Mostafa 2014)

There was also concern for the pupils with the world outside the classroom where the incidental and unexpected can happen. Therefore there were occasions where extra space was given outside the Dining Hall or PE Hall to facilitate waiting and preparing to enter what

for many of the pupils, are difficult environments; full of noise, smells and bustle. This might well not only be to help provide the reassurance of predictability and routine that pupils with ASC often like (Young 2004; Vogel 2008) but may, in terms of proxemics, also indicate a desire and need for additional space in shared areas in which to feel comfortable. (Humphreys, 2005) All the pupils wanted their own outside play area alongside other play areas in the school thereby providing a choice of different places when outside. There was also a desire to promote a sense of security, not only for themselves, but also for younger pupils in the school. For pupils who are more vulnerable to bullying, (Humphrey & Symes 2010; Cappadocia et al, 2012) recognising that others in addition to themselves, may also be vulnerable, is striking. In that regard, staff rooms and sixth former suites were seen as providing security. Fundamentally, all the pupils wanted their ASC Resource Base within the school building suggesting that they were accepting and welcoming of their integration into the mainstream learning environment. School was important to them, not just as a venue, but also how it looked and operated, with a number of the pupils interested in the expression and legibility of the school.

In doing so, the results of the workshops do confirm many of the considerations for the physical school environment in current design guidelines. (DfEE, 2001; DoENI, 2005; DfEE, 2009) But the authors contend that the workshops go further by highlighting the elements within school design that are perhaps, most important to the pupils. Avoiding noise, a dislike of the incidental and having clarity in the school layout are all stressed. If wanting then to provide more inclusive school design for pupils with autism and opportunities to avoid noise and cope better with challenges, this might well mean providing more time and space and in which to feel comfortable. This would be both in rooms and in circulation areas, in order to provide places to pause, consider what to do next, reflect, converse, watch others and learn. Providing as wide a range of environments and sensory experiences within a school can only aid in this aspiration.

However, this would mean genuinely recognising the value of good school design, and being prepared to pay for it. A basic question that then needs to be asked would be, 'should our school buildings be built to maximise the health, education and comfort of our pupils or simply achieve a minimum level of design performance at a lowest available cost?' Providing a variety and range of environments in a school will come at a cost.

Yet choice when outside of the timetabled scheduled teaching classes is both important to the pupil and therefore of genuine value. As children are all different, they learn in different ways, in different times, and in different places. (Rigolon & Alloway, 2011) A range of choice and affordances will help give pupils that range of different learning environments that will nurture as wide a range of pupils as possible. (Spencer & Blades, 2006) Any school

environment therefore should be one with variety. It was particularly noticeable that in the design workshops, the pupils with ASC always provided more than one external playground in each of their school designs, reminding us that it is not just the internal school environment that is important but also the external one. This observation is supported by Alexander (1972) when stating that 'Play itself, goes on somewhere different everyday..... Play takes place in a thousand places.'

The external school environment is therefore extremely significant, more so when one considers that playgrounds are places for pupils to test and develop motor skills and also feel the benefits of physical exercise. For pupils who can often present with poor fitness levels (Place et al, 2015) and motor difficulties, this is especially valuable. Well-designed playgrounds and gardens may aid cognitive development by providing students of all ages with places to test new skills. For all pupils, including those with special needs, a well-designed learning environment would recognise the fact that preparation for life needs not only to be academic, but also needs to aid in the pupils' social, physical and mental well-being.

Conclusion

Whilst consideration of the built and physical environment is only one component in providing an effective 'enabling environment' for the pupil with ASC (Guldborg 2010, p.170), it is widely accepted that a well-designed learning environment can facilitate social and academic learning. (Dudek 2005; Day 2007). Furthermore, good design will facilitate the views and input of as many people as possible. If going to be truly inclusive this needs to be done at an early design stage so that users, including those with special educational needs, get the opportunity to better inform designers as to their requirements. We, as a society, need to develop methods that allow and encourage all those with disability, difference and individual challenges to input into their school environment. A difficulty exists when those with special needs, including those with ASC are alienated.

With the individual and our Built Environment intricately bound to one another, neither can really be understood without the inclusion and consideration of the other. This however needs to be done objectively, when we critically evaluate and consider both accepted and new strategies. Recognising this, the authors sought to learn more about the school environment as seen through the eyes of pupils with ASC by means of developing a simple 'jigsaw kit' of parts. Results not only add weight to current design considerations for the autism-friendly school environment but also suggest that the pupils with ASC want greater choice and opportunities outside of the classroom. That choice can include a range of differing environments for the pupils to encounter. If balanced with the security and safety

provided by the careful positioning of an ASC Resource Base, quiet room provision and staff support, might that be achievable in more of our schools? If accepting this premise, a further design consideration might be that if providing greater pupil choice to a range of different environments would help constitute a more beneficial autism-friendly learning environment and one that better prepares the pupil with ASC for life outside of school (McAllister & Sloan 2015)

Intriguingly, further questions might then arise. Are these opportunities present in our schools to date? If greater choices were available in our schools, could more pupils with special needs be able to cope better with integration? Might a school designed by those with a critical eye, such as pupils with ASC, benefit all pupils? Might a school that lessens stresses and strains provide a better learning environment that would support improved pupil performance by all?

However, before embarking on further research projects, first and foremost, the authors can relay, that the pupils who took part in the workshops felt a sense of value and pride when given the opportunity to forward their ideas for school design. There are many benefits to genuine participatory design. (Sanoff, 2008) The four design workshops evidenced many of these and allowed the pupils to explain in their own words, why they had made their design choices. In that alone, we thank both the pupils and staff of the participating schools for their input and generosity of time and spirit in better educating us, the researchers.

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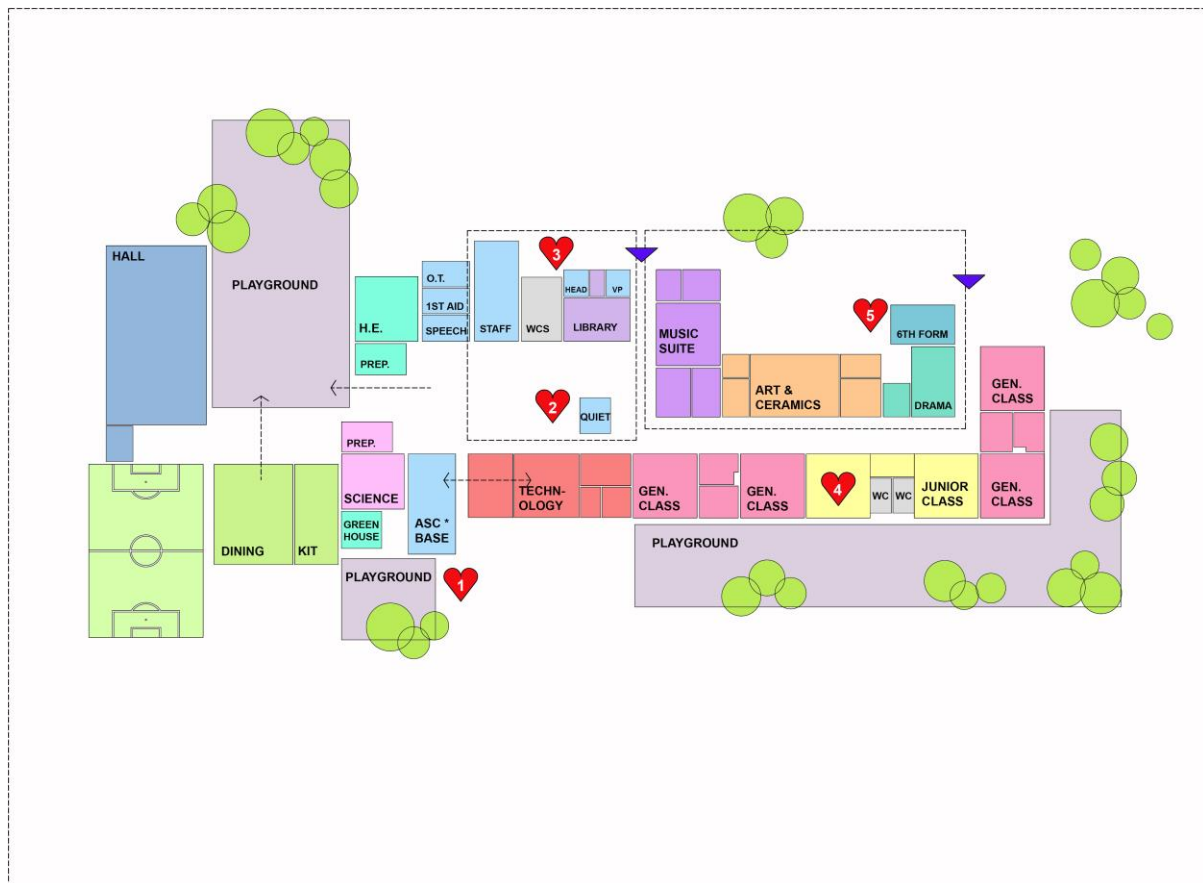
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Fact Sheets

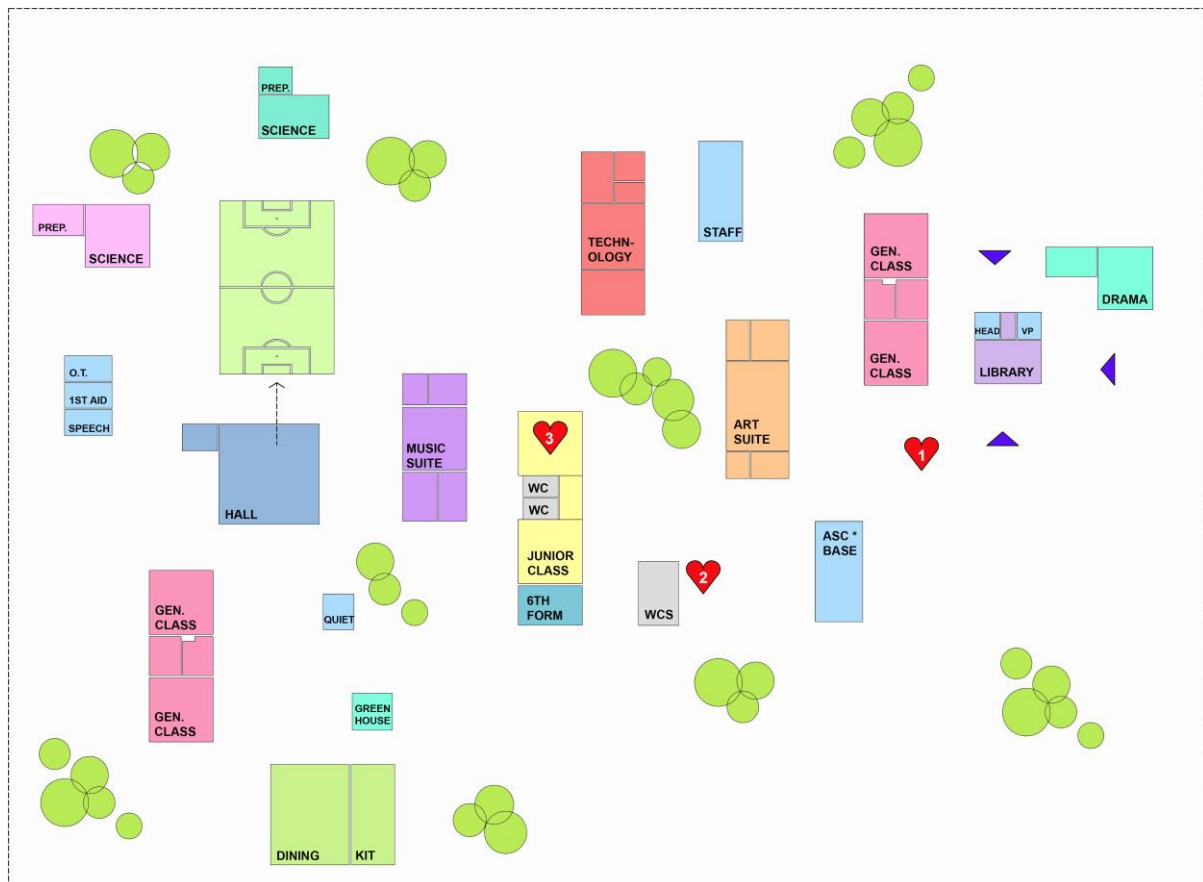
Fact Sheet H1. Adam, Ben & Cate



Key Illustrated Observations.

1. Choice - Own external play area provided for the ASC Resource Base
2. Noise - Quiet Room positioned centrally in the school for ease of access.
3. Security – centrally positioned staff room and principal's office.
4. Safety – (for the junior pupils) – the junior classrooms purposely positioned between the older children's classrooms.
5. 6th Form given additional responsibility by being charged to monitor the second entrance.

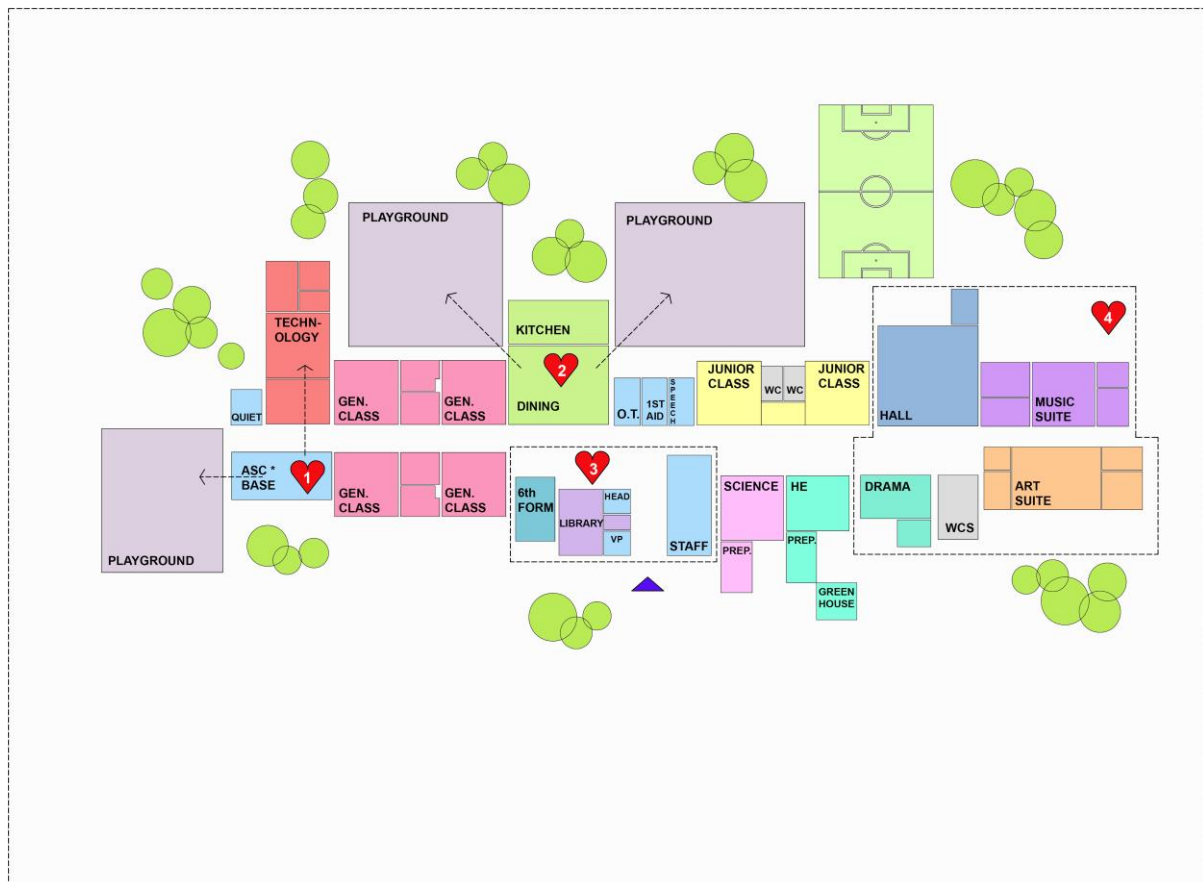
Fact Sheet H2. Dan



Key Illustrated Observations.

1. Choice – A range of outdoor spaces and routes between all accommodation.
2. Comfort – Ensuring 'space' between all rooms.
3. Safety – The Junior Classrooms are placed adjacent to the 6th Form Classroom Base.

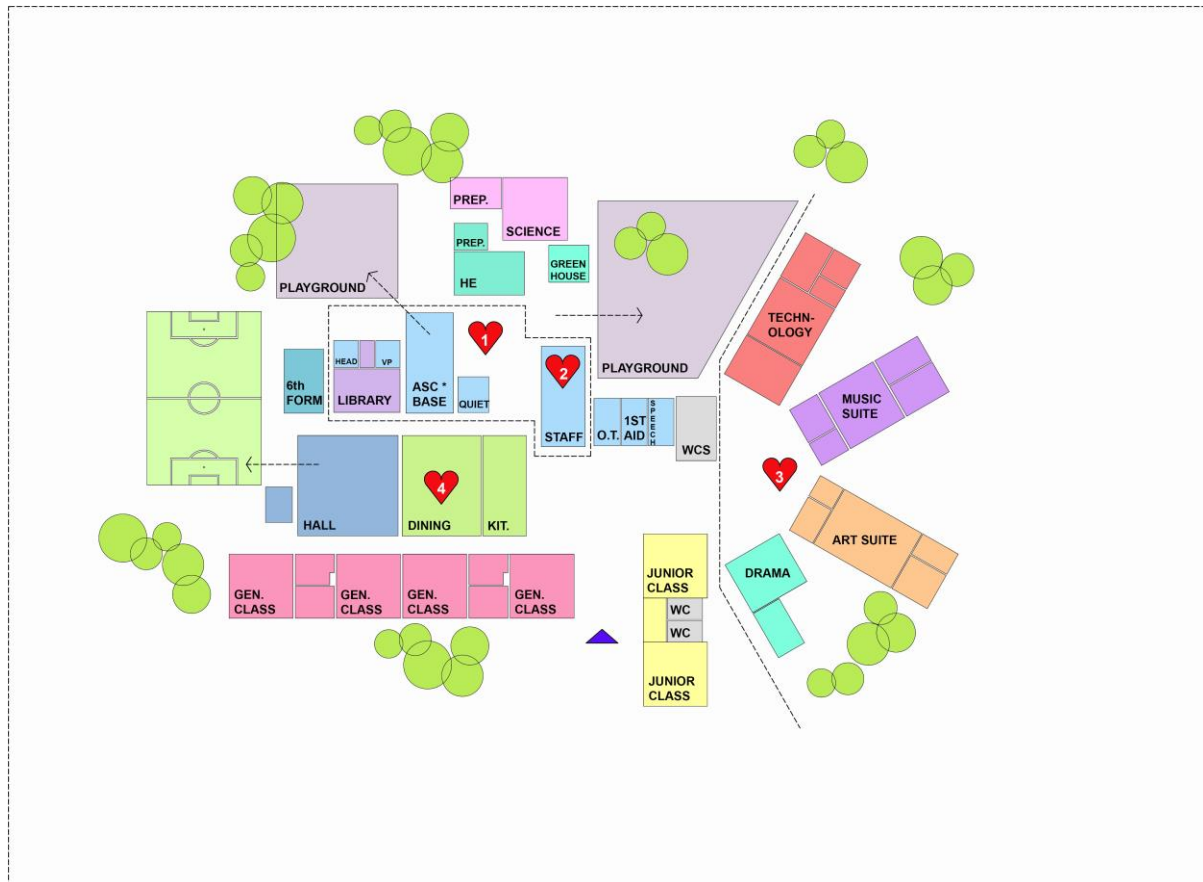
Fact Sheet H3. Eddie, Fred, Gary & Helen



Key Illustrated Observations.

1. Choice - Own external play area provided for the ASC Resource Base.
2. Noise – A range of choices available to exit from the noisy Dining Hall.
3. Security – Centrally positioned staff room and principal's office.
4. Noise – Accommodation deemed as noisy is grouped together and positioned away from the position of the ASC Base.

Fact Sheet H4. Ida



Key Illustrated Observations.

1. Choice - Own external play area provided for the ASC Resource Base.
2. Security – Centrally positioned staff room and principal's office.
3. Legibility – Creative rooms (drama, art, music and technology) should be expressed differently from other accommodation signifying their function.
4. Dining Hall – Positioned close to the ASC Resource Base as the Dining Hall is a 'difficult' environment. Therefore pupils from the ASC Resource Base can get in first and are able to return to their classroom quickly if they are uncomfortable.

Fact Sheet C1. Karen & Lewis



Key Illustrated Observations.

1. Legibility – ASC Resource Base is the first classroom accessed after the entrance.
2. Choice – Centrally spacious circulation space with time to decide where to go to
3. Safety – for junior pupils by providing their own Junior Playground.
4. Noise – Purposely isolate the music suite from the rest of the school.
5. Noise – Ensure that there are quiet rooms in all of the general and junior classrooms.

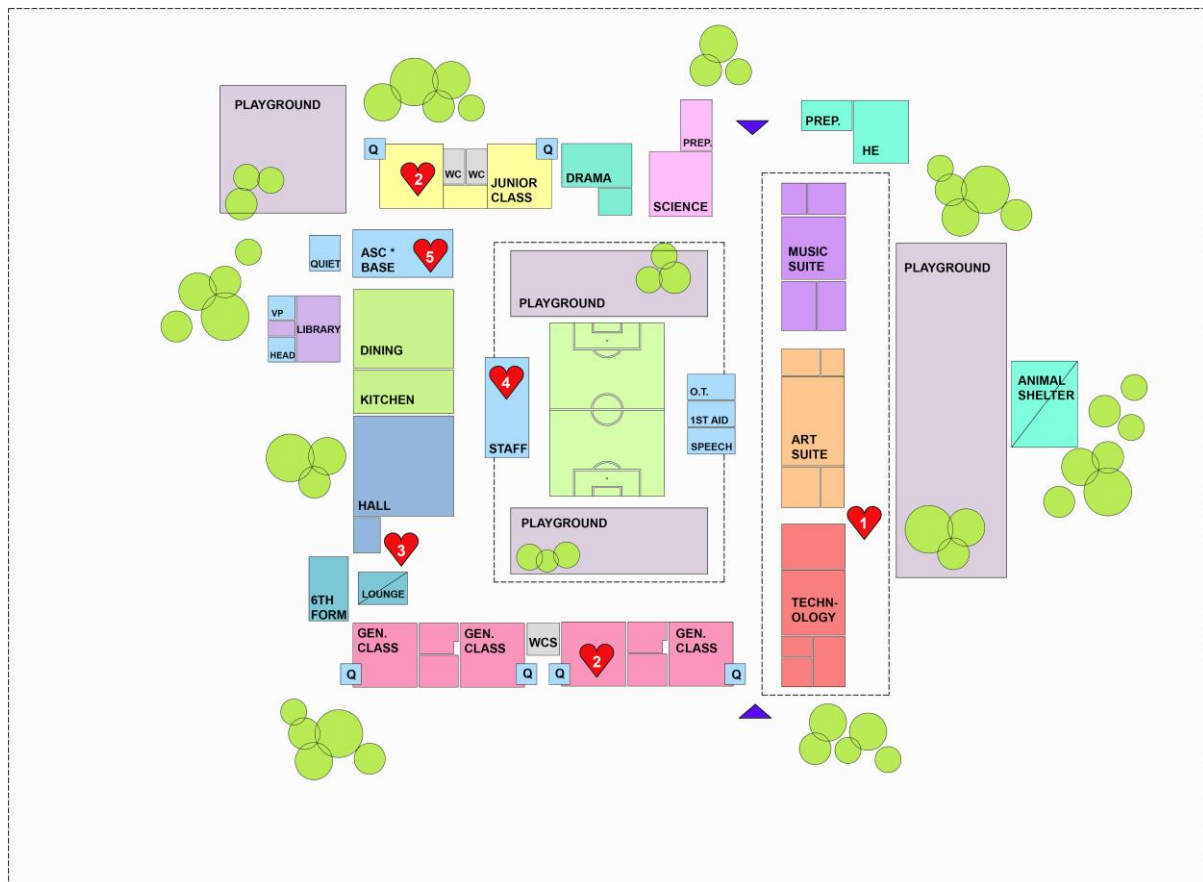
Fact Sheet C2. Mark, Nigel & Oscar



Key Illustrated Observations.

1. Choice – Own external play area and entrance provided for the ASC Resource Base.
2. Safety – for junior pupils by providing their own Junior Playground centrally in the school.
3. Safety - Staff overlook the central playground.
4. Noise – separate the music and drama suites away from ASC Resource Base.
5. Comfort – Provide more circulation space to prepare before going into the Dining Hall.
6. Recognise responsibility of the older pupils by giving them a 'reward,' – in this case a gaming room.
7. Safety – The Science Suite is located away from all of the other accommodation due to the increased fire risk of using chemicals.

Fact Sheet C3. Paul, Quinn & Ray



Key Illustrated Observations.

1. Noise – Accommodation deemed as noisy is grouped together and positioned away from the position of the ASC Base.
2. Noise – the general and junior classrooms all have their own quiet rooms.
3. Comfort – Provide more circulation space to help prepare before going into the PE Hall.
4. Security – staff overlook the central playground.
5. Comfort – The Dining Hall is positioned close to the ASC Resource Base as it is a 'difficult' environment. Therefore pupils from the ASC Resource Base can get in first and are able to return to their classroom quickly if they are uncomfortable

Designed By the Pupils, for the Pupils: an Autism-Friendly School

Keith McAllister & Sean Sloan. Queen's University Belfast

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Bios

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